



Safe Cooking with Microwaves

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More than eight out of ten American households have a microwave oven, making it a more commonly owned kitchen appliance than the dishwasher. About a third of those households use the microwave oven as the main cooking appliance. Hawaii households are also enthusiastic users of microwave ovens because we have so many two-career families with hectic schedules. Almost half of those with microwave ovens say they use it more than three times a day. Most packaged foods now include instructions for microwave preparation—quite an achievement for a household appliance that first appeared as a countertop unit for the home only about 35 years ago. Yet there are people who are still not sure how safe these appliances are.

What are microwaves?

Microwaves are a form of electromagnetic energy, like the energy used to transmit the signals of radio, TV, and radar. Rays of light are a related form of energy. These energy forms are also called non-ionizing radiation. Microwaves are not the same as—and do not carry the high energy of—gamma rays and x-rays, which are called ionizing radiation. Microwaves are absorbed by certain types of molecules in a food called polar molecules (water is a polar molecule). The microwaves cause these molecules to vibrate at high frequency. When the molecules move very fast, they generate friction among themselves, resulting in the food heating up. Foods up to a few inches thick heat uniformly and quickly because all the polar molecules absorb microwaves and therefore generate heat at the same time. It is not true that a food cooks from the inside out in a microwave oven.

Microwave oven safety standard

The U.S. Food and Drug Administration's Center for Devices and Radiological Health enforces regulations ensuring the safety of microwave ovens. These state that microwave ovens manufactured after October 16, 1971 (1) cannot emit radiation above specified levels, (2) must have at least two independently-operating safety interlocks to shut off radiation as oven doors are opened, and (3) must carry a label certifying compliance with federal standards. In addition, all ovens made after October 1975 are required to have a label explaining precautions for use unless the manufacturer has proven that the oven will not exceed the allowable leakage limit.

Microwave oven leakage

There have been concerns in the past that microwave leakage may be harmful. To minimize microwave leakage, always operate and maintain your oven according to the manufacturer's instructions. Make sure the door closes properly and that there is no damage to the door, hinges, latches, seals, or sealing surface. Clean off any soil or food residues around the door seal. Stay at least an arm's length away from an operating oven. And ask only a qualified service person to check or repair your oven.

Microwave ovens and pacemakers

Pacemakers are currently shielded against electrical interference such as that from electric shavers, auto ignition systems, and other electronic products that emit microwaves. That is why FDA does not require microwave ovens to carry a warning sign for people with pacemakers.

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Containers for the microwave oven

Air inside a microwave oven is not hot after cooking because air does not absorb microwaves. Microwaves are reflected by metal, but large pieces of metal may cause arcing and damage the oven. Many types of glass, paper, and plastic do not heat up because they let microwaves pass through. But the container will be hot because heat from the food is transferred to the container—so be careful in handling them.

It is not true that all plastics are incompatible for use in the microwave oven, as maintained in some hoaxes spread around the Internet. Containers that are labeled “for microwave oven use,” including plastic ones, should be safe to use. The reason why it is important to use only those containers designed for microwave oven use is because some undesirable compounds found in other containers that are not for microwave oven use may migrate to the food being heated. Plastic containers that should not be used in the microwave oven include margarine tubs, take-out containers, and other one-time use containers. As a precaution, do not let plastic wraps, even those approved for use in the microwave oven, touch the food during microwave oven use because of the possibility of the plastic melting.

Do not overcook—follow the manufacturer’s instructions for use

Overcooking foods in the microwave oven may cause problems. Fires can result from overheated paper in contact with fatty foods, paper exposed to a spark (such as when arcing occurs), or use of newspapers, recycled paper products, and colored paper towels that might incorporate printing inks that absorb microwaves. Heating water or liquids in the microwave oven for excessive amounts of time may result in superheated liquids that do not appear to boil but then explode out of the container when there is a slight disturbance or movement, such as picking up the container or pouring in sugar. Carefully follow the instruction manual for heating times and types of containers that may be used.

To prevent explosions due to pressure build-up, do not heat any food in a tightly closed container. Lids should be loose fitting during cooking. Allow steam to escape first before removing the cover entirely. Also, puncture the outer skin or cover of food items such as sausages, hot dogs, and potatoes before cooking. Never do home canning in a microwave oven.

For more information, visit U.S. Department of Agriculture website http://www.fsis.usda.gov/oa/pubs/fact_microwave.htm